Declining Birth rates in the US: An Analysis of Potential Factors*

Reproduction of 'The Puzzle of Falling US Birth Rates since the Great Recession' (Kearney, Levine & Pardue, 2022)

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25 February 2022

Abstract

Over the past 10 years, US birth rates have been dropping steadily to an all time low of 55.8 per 1,000 women in 2020. Kearney, Levine and Pardue (2022) analyzed this phenomenon by exploring demographic, economic, social and policy factors to little avail in enlightenment. However, they did discover a correlation between the decline and the birth cohorts of mothers, and offer the conjecture of shifting priorities as the reasoning. We replicate the results of this study with respect to the demographic and cohort effects, and discuss alternative interpretations of the data considering the impact of the feminist movement and the evolution of technology and media. The results were consistent with the initial study.

1 Introduction

Birth rate is the number of live births per thousand in the population by year (Google dictionary). It is closely related to total fertility rate, which is the number of children that a hypothetical female would have over the course of her reproductive life Statistics Canada. Birth rate is important since it is an indicator of population growth and determines the age structure of populations, which has various implications for the economy and society (Cleland 2008). When the birth rate is too high or low, it affects all subgroups of the population in different ways, for example, a large number of new births will be a burden on the adult population to support them, and when this group ages to be elderly they will be a burden on governments to support them (Cleland 2008).

There are many possible factors that can affect birth rate. Recessions have been proposed to result in a drop in birth rates, specifically the Great Recession of 2007 (Livingston and Cohn 2010; Percheski and Kimbro 2014; Sobotka and Philipov 2011). Becker (1960) proposes an economic framework for fertility, where the "demand for children" is driven by the satisfaction that children brings to people weighted against factors such as preferences (e.g. religion, race, age), income, time, expenditure and means to support each child and other considerations (e.g. contraception, marriage). Kearney, Levine, and Pardue (2022) base their analysis of the declining US birth rates on these factors.

These analyses however, did not provide sufficient evidence to explain the decline in birth rates, with the authors stating "For any factor to have explained much of that decline, it would have had to change dramatically around the same time." (Kearney, Levine, and Pardue 2022). Kearney, Levine, and Pardue (2022) then went on to find a correlation between the recent birth cohorts of mothers and the substantial decline. In our reproduction of their paper, we build on their 'shifting priorities' explanation of the cohort effects by considering the other notable events that potentially may have influenced the nature of parenting of these cohorts, namely the Third wave of Feminism and the second half of the Digital Revolution.

*Code and data are available at: LINK.

Table 1: Ten rows of the birth rate data for years 1980-2020

Year	All races	Ages 15-19	Ages 20-24	Ages 25-29	Ages 30-34	Ages 35-39	Ages 40-44	White, non-Hispanic
1990	70.9	59.9	116.5	120.2	80.8	31.7	5.5	62.8
1991	69.3	61.8	115.3	117.2	79.2	31.9	5.5	60.9
1992	68.4	60.3	113.7	115.7	79.6	32.3	5.9	60.0
1993	67.0	59.0	111.3	113.2	79.9	32.7	6.1	58.9
1994	65.9	58.2	109.2	111.0	80.4	33.4	6.4	58.2
1995	64.6	56.0	107.5	108.8	81.1	34.0	6.6	57.5
1996	64.1	53.5	107.8	108.6	82.1	34.9	6.8	57.1
1997	63.6	51.3	107.3	108.3	83.0	35.7	7.1	56.8
1998	64.3	50.3	108.4	110.2	85.2	36.9	7.4	57.6
1999	64.4	48.8	107.9	111.2	87.1	37.8	7.4	57.7

We replicate the paper by Kearney, Levine, and Pardue (2022) with a focus on the following research questions:

- What is the trend in US birth rates over the period 1980-2020?
- How does the trend in birth rates vary with demographic factors such as age, race, education and marital status?
- How do the birth rates vary for different cohorts of mothers by their birth year?

While the original paper used Stata (StataCorp 2021) for data processing and analysis, we use R (R Core Team 2020) for all data wrangling and analysis.

2 Data

2.1 Data Source and Methodology

The data on birth rates per 1,000 women ages 15-44 across all races and demographic population subgroups are obtained from the National Vital Statistics Reports for the years 2015, 2019 and 2020 (Martin and Mathews 2017; Martin and Driscoll 2021; Hamilton and Osterman 2021), which they collected from birth certificates registered in all states and the District of Colombia. Aggregated data on the number of births for different cohorts of mothers by their age and birth year is provided by Kearney, Levine, and Pardue (2022), calculated using public birth microdata across the period 1980-1989 from the NBER Natality Database and NCHS microdata from the period 1990-2019 (CDC NCHS 2020, NBER 2021b).

Single-age population counts, among all races from 1969-2019 and by race and Hispanic origin from 1990-2019, is obtained from the CDC SEER database (CDC NCI 2021).

2.2 Attributes

The birth data consists of variables for the year, and birth rate for each population subgroup. For example, for race there are 3 variables: birth rate for whites, birth rate for blacks and birth rate for hispanics. A glimpse of the data can be seen in table 1.

For the aggregated cohort birth data, the variables are mother's age, birth cohort, number of births and cumulative births.

Here is a glimpse of the data:

For the population data, we process it.

Table 2: First ten rows of the birth cohort data for 6 birth cohorts

Mother's age	Cohort #	Number of births	Cumulative births
15	1	121158	121158
16	1	268005	389163
17	1	461462	850625
18	1	677810	1528435
19	1	892714	2421149
20	1	1004168	3425317
21	1	1060746	4486063
22	1	1074214	5560277
23	1	1054644	6614921
24	1	1049909	7664830

Table 3: First ten rows of the population data for 6 birth cohorts

Cohort #	Mother's age	Population
1	15	8978763
1	16	8987457
1	17	9102192
1	18	9092741
1	19	9655879
1	20	9625147
1	21	9454383
1	22	9273533
1	23	9295797
1	24	9542999

```
## `summarise()` has grouped output by 'cohort2'. You can override using the `.groups` argument.
```

3 Results

3.1 Overall Trend

3.2 Demographic Factors

3.3 Cohorts

4 Discussion

4.1 Why is the declining birth rate relevant?

If my paper were 10 pages, then should be be at least 2.5 pages. The discussion is a chance to show off what you know and what you learnt from all this.

4.2

4.3 Cohort effects - feminism, technological influence, media?

4.4 Weaknesses and next steps

Weaknesses and next steps should also be included.

Appendix

A Additional details

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